

EXAMPLES DEMONSTRATING RELATIONSHIPS AMONG GOALS AND OBJECTIVES, VIABILITY ATTRIBUTES, MONITORING, AND ADAPTIVE MANAGEMENT FOR SELECTED SPECIES

EXAMPLE 1: POPULATION-LEVEL OBJECTIVE—SPRING-RUN CHINOOK SALMON

Conservation Goal: Restore and maintain viable populations of covered species.

Biological Goal: Goal CHIN1: Improve the survival of juvenile Chinook salmon passing through the Delta.

.Objective CHIN1.2: Increase the survival of juvenile Sacramento Basin spring-run Chinook salmon passing Chipps Island in the BDCP long-term implementation period by [] percent, fall/late fall-run Chinook salmon by [] percent, and winter-run Chinook salmon by [] percent from mean survival rates observed from [year] to [year].

Viability Attribute Addressed: Abundance

Stressors Addressed: Entrainment, predation, food abundance, migration

Conservation Measures: multiple operations, habitat restoration, and other stressors conservation measures.

Conservation Measure Hypothesis: Reduction in entrainment and predation of juvenile spring-run Chinook salmon, increased juvenile spring-run Chinook salmon rearing habitat and food, provision of spring-run Chinook salmon outmigration transport flows, and reduction in contaminants will increase the survival of spring-run Chinook salmon successfully migrating through the Delta.

Adaptive Management Monitoring Indicators:

- Percent survival of juvenile spring-run Chinook salmon passing through the Delta.

Effectiveness Monitoring:

1. Establish baseline survival indices for juvenile survival based on existing data or data collected before BDCP implementation.
2. Annually (initially) monitor abundance of juvenile spring-run Chinook salmon from November-April upstream of Delta to establish an abundance index of juveniles entering the Delta during each monitoring year.
3. Annually (initially) monitor abundance of juvenile spring-run Chinook salmon in the vicinity of Chipps Island from November-April to establish the abundance index of juveniles emigrating from the Delta.
4. Difference in abundance index between Item #2 and Item #3 in each year establishes percent juvenile survival for that year.

5. Difference between Item #4 value and Item #1 value is used to assess whether or not survival is trending towards achieving or is achieving the survival objective.

Adaptive Management:

If the objective is not being achieved or trending towards being achieved, the BDCP Implementing Entity and others as appropriate review results of all relevant monitoring and other information (e.g., degree to which conservation measures have been implemented, results of conservation measure effectiveness monitoring, watershed conditions) are reviewed to determine if BDCP implementation needs to be adjusted to improve survival of spring-run Chinook salmon passing through the Delta.

EXAMPLE 2: ECOSYSTEM-LEVEL OBJECTIVE—SPRING-RUN CHINOOK SALMON

Conservation Goal: Restore and maintain viable populations of covered species.

Biological Goal 2: Goal ECSY 3: Reduce the adverse effects of non-native species on the Delta's aquatic ecosystem and the productivity, abundance, distribution of covered fish species.

Objective ECSY3.1: Manage the distribution and abundance of established non-native invasive species in the Delta to reduce non-native species predation on and competition with covered fish species.

Conservation Measure: Remove non-native submerged and floating aquatic vegetation from Delta waterways.¹

Conservation Measure Hypothesis: Removal of non-native submerged and floating aquatic vegetation from Delta waterways used by spring-run Chinook salmon will:

- Reduce the abundance of non-native fish that prey on juvenile spring-run salmon and/or reduce the predation effectiveness of non-native predatory fish
- Increase the survival of juvenile spring-run Chinook salmon passing through treated waterways by reducing the predation mortality.

Adaptive Management Monitoring Indicators:

- Change in non-native fish predator abundance in treated waterways.
- Change in survival of juvenile spring-run Chinook salmon passing through treated waterways.

Effectiveness Monitoring:

1. Conduct surveys to establish baseline:
 - abundance of non-native predatory fish in Delta waterways to be treated before treatments are implemented

¹ It is anticipated that performance targets (e.g., miles of treated waterways, surface acres of vegetation removed) would be identified in BDCP funded contracts with Department of Boating and Waterways.

Handout #11

- percent survival of juvenile salmonids passing through Delta waterways to be treated before treatments are implemented
2. Conduct surveys following treatment to determine:
 - change in non-native predatory fish abundance following treatment in the waterway
 - change in percent survival of juvenile salmonids passing through the treated waterway

Performance Monitoring:

1. Conduct surveys to establish baseline distribution and density of non-native submerged and floating aquatic vegetation in waterway to be treated.
2. Following treatment, conduct surveys to:
 - determine change in the distribution and density of non-native submerged and floating aquatic vegetation following treatment
 - determine the duration that the distribution and density of non-native submerged and floating aquatic vegetation remain at desirable levels

Adaptive Management:

1. BDCP Implementing Entity and others as appropriate review results of effectiveness monitoring to determine if the abundance of non-native predatory fish is reduced in the treated waterway to desirable levels and if the survival of juveniles passing through the treated waterway is substantially increased.
2. If treatments achieve desired results, continue and expand areas to be treated. If strong correlations are established between treatments and juvenile survival in treated waterways, monitoring requirements may be curtailed or terminated.
3. If treatments do not achieve desired non-native predatory fish and juvenile spring-run Chinook salmon responses, the BDCP Implementing Entity, based on effectiveness and performance monitoring results, may modify treatments to improve success of the action or discontinue the action if the initial hypothesis is disproved.